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ABSTRACT

The effectiveness of employing educationally advanced inmates as one-to-one basic education tutors for inmate students was evaluated. In conjunction with this evaluation, an experimental study of the most efficient material presentation and testing techniques using this manpower resource was conducted. Three different modes of presenting programmed material and two modes of testing both immediate and long-term retention were used, and the effectiveness of these modes was assessed in terms of accuracy and response rate. One mode of presentation involved the use of the programmed text in the usual manner, with no specification of response to topography. For the second mode, the course was cut into frames for use with a specially developed "teaching machine," requiring a written response to each frame. In the third mode, frames were pasted to index cards with the answers on the reverse side. Tutors presented questions, acknowledged responses, indicated correct and incorrect answers, and discussed errors following each learning session. In this mode, "Precision Teaching," a verbal response and interpersonal contact were required. Testing consisted of either the traditional fill-in-the blank procedure or a personalized technique in which the tutors presented the test items directly to the students. Precision teaching was shown to generate higher rates of emission of correct responses on criterion tests than the teaching machine, which in turn exceeded the rate generated by the textbook alone. (Author/CK)

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IMPRISONED RESOURCES--INNOVATIVE TECHNIQUES IN EDUCATING PRISON INMATES

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ABSTRACT

The effectiveness of employing educationally advanced inmates as one-to-one basic education tutors for inmate students was evaluated. In conjunction with this evaluation, an experimental study of the most efficient material presentation and testing techniques using this manpower resource was conducted.

Tutors and students were selected from inmates participating in an ongoing experimental-demonstration token economy project located at an institution for adult male felons.

Three different modes of presenting programmed material (English 2600) and two modes of testing both immediate (one day) and long-term (one week) retention were used, and the effectiveness of these modes was assessed in terms of accuracy and response rate. One mode of presentation involved the use of the programmed text in the usual manner, with no specification of response topography. For the second mode, the course was cut into frames for use with a specially developed "teaching machine," requiring a written response to each frame. In the third mode, frames were pasted to index cards with the answers on the reverse side. Tutors presented questions, acknowledged responses, indicated correct and incorrect answers, and discussed errors following each learning session. In this mode, Precision Teaching, a verbal response and interpersonal contact were required.

Testing consisted of either the traditional fill-in-the-blank procedure or a personalized technique in which the tutors presented the test items directly to the students.

Precision teaching was shown to generate higher rates of emission of correct responses on criterion tests than the teaching machine, which in turn exceeded the rates generated by the textbook alone.

Implications of this study toward the design of inmate educational programs are discussed, emphasizing factors such as economic feasibility, efficiency measures, and peripheral effects on the inmate culture.

IMPRISONED RESOURCES--INNOVATIVE TECHNIQUES IN EDUCATING PRISON INMATES*

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INTRODUCTION

Educational specialists are currently conducting an evaluation of the trends of programmed instruction. Traditionally, the programming paradigm encourages decreasing "teacher" interaction and increasing automation of study. However, there appear to be some areas in which programming must be augmented by tutorial assistance. Some of the most creative research in the contingencies of learning is being generated in those areas in which it is felt that textbook or teaching machine programming would be too subtle and complex to break into frames.

Keller (1968) administered a class in which the material was perhaps too complicated for linear programming, but did adhere to the Skinnerian guidelines of material presentation insofar as possible. In Keller's classes, the bulk of the instruction was carried out by a "noncommissioned cadre" with the few professional teachers left free to deal with course logistics (lesson plans, selection of personnel, etc.).

Johnston and Pennypacker (1971) describe a long-term study in which individual instruction was implemented for upper division college courses. By using superior students who had previously completed the courses as on-line instructors (learning managers), a single professor was enabled to provide personalized instruction for as many as 160 students in a single course and 250 students in two courses in a single quarter. Specific changes in student performance were defined as the goal of this instructional

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method. The authors report, "The major effect of these procedures was to generate in every student an enormous quantity of verbal behavior concerning the defined subject matter of the course (p.16)."

None of the studies mentioned above use programmed instruction exclusively but embrace the principles of learning theory which precipitated programmed materials and utilize them in ways which take into account the particular problems (as well as resources) of their learning environments. The present paper is concerned with yet another unique learning environment--a prison for adult male felons. The problems inherent in educational programs involving institutionalized offenders have been documented by McKee (1962); Cohen, Filipczak and Bis (1965); McKee and Clements (1967); Clements and McKee (1968); McKee (1967); and Jenkins, et al. (1969). The methodology of these studies involved principally the payment of money contingent upon frames studied, criterion test scores, or a combination of these two variables. McKee (1970) recognizes the problems inherent in the motivation of prison inmates and suggests some guidelines to the use of programmed instruction with such a population. Included in his suggestions are:

1. Develop a thorough theoretical understanding of programmed instruction, including reinforcement theory and contingency management.
2. Insure management staff commitment to programmed instruction.
3. Use small instructional units with reinforcement following the learning as soon as possible.
4. Relate the educational materials as closely as possible to occupational goals.
5. Involve the trainee in planning and operating the instructional system insofar as possible.

6. Employ paraprofessionals, such as college students, to assist in the training system. These persons serve to manage the learning.

In the diverse learning environments of the Johnston and Pennypacker (1971) and McKee (1970) studies, the commonality is in the use of subprofessionals as on-line learning managers. The interaction of the students with these individuals comprised the bulk of the interpersonal "teaching" of the students. This creative use of available manpower in two environments so dissimilar as an upper-division college class and a prison stimulates thought concerning the logical extension of this reasoning.

Education, unfortunately, is largely structured in terms of economic priorities. Ideally, of course, personal tutors of the Socratic tradition would be provided for all students. Certainly, if computer-assisted programming could be advanced to such a level that all course material were programmed in impeccable form, specifically for each individual, it would be even more effective than it is. The machinery and technical skill necessary in computer-assisted programmed instruction is expensive, and highly trained professionals are in short supply in universities and thus could not be provided for all students no matter what the cost. However, everyone in a learning environment possesses a certain level of competence in all learning areas, and could, if properly guided, assist in communicating information to students of lesser knowledge attainment. In their program, Johnston and Pennypacker (1971) utilized students who had just completed the course in his program. McKee (1970) used personnel of "less requirements than a college degree and teaching certificates" with incarcerated adults. The present study was designed to demonstrate that this principle can be extended greatly, such that an effective learning situation could be developed and implemented within a prison in which prison inmates with a

higher achievement level serve as the primary interpersonal contacts in the education of inmates with a lower achievement level.

The study utilizes programmed instructional material. Material presentation and testing techniques are manipulated in such a way that statements concerning the feasibility and most desirable means of implementing this manpower resource may be made.

METHOD

Subjects

Nine male inmates incarcerated at Draper Correctional Center served as "students" in the project; additionally, eight of their peers served as "tutors." Ss, both students and tutors, were selected from residents of an experimental living environment (Ecological Unit) designed and administered by the Experimental Manpower Laboratory for Corrections (EMLC). Residents of the unit were distributed evenly between those participating in concurrent vocational and basic education training administered by the EMLC and those who were participating in no such training. Tutors were chosen from the group receiving training, and students were chosen from those residents not in training. All subjects volunteered for their roles in the project. Ages of the students ranged from eighteen to twenty-five and tutors, from nineteen to thirty-four. Grade placement, as measured by the Test of Adult Basic Education, ranged for students from 5.1 to 9.1 and for tutors, from 6.1 to 11.8.

Facilities

The Ecological Unit is located in Draper Correctional Center in Elmore, Alabama, in a vacated cell block. The current experiment was centered in the office areas of the unit which housed records and materials and those surrounding tutoring rooms in which the instructions took place. One room

was reserved for the teaching machine (to be described below); in the other rooms, tables and chairs were provided.

Apparatus (Materials)

The teaching material used was the programmed textbook, English 2600, second edition, published by Harcourt, Brace and World, 1964. This is a linear-programmed textbook of 2,632 frames broken down into 69 lessons of approximately 38 frames each. The book is so arranged that the answer frames appear on the page following the question frame. The books are bound; responses were written on separate paper. Subtitled, A Programmed Course in Grammar and Usage, the book stresses sentence structure, parts of speech, and punctuation. The book emphasizes the learning theory foundation of programmed instruction and, in fact, summarizes its intent in the introduction to the student.

All subjects were provided with means to write their responses and in the teaching machine and programmed tutoring sections (see Procedure) were required to do so. Stop watches were provided for tutors to record studying and testing rates.

Procedure

Tutors were initially assigned to students on a free choice basis. Changes in assignments were made later due to personality and scheduling conflicts. For the most part, however, switching of tutors was avoided to provide as much continuity as possible.

Teaching. The material was presented to the student one lesson per day throughout the book. The material was presented in each of three modes to each student. The sequence of presentation was balanced in such a way that possible order effect was minimized. Each teaching mode was presented an equal number of times in an A-B-C-C-B-A outline. The first of the three

presentation modes simulated traditional classroom usage of programmed textbooks and is referred to hereafter as "Classroom Programmed Textbook." In this mode, the tutor issued a textbook to the student and assigned him a work area. The student was instructed to respond to the frames in the manner of his choice (overtly or covertly). They were instructed to respond to each frame before continuing to the next. The tutor was available to answer questions by the student, but was, however, instructed to proffer no more information than was necessary to answer questions.

In the second teaching mode, the original textbook frames were cut apart and pasted sequentially on continuous rolls of paper, each roll being one lesson in length (see Figure 1). A mechanical stimulus-presenting device was developed which automated material presentation. In this mode, the student was required to emit an overt (written) response before continuing to the next frame. Counters recorded the number of correct and incorrect responses. This mode simulated the concept of the teaching machine and will be referred to as such below. In this mode, as with the Classroom Programmed Textbook, questions about the material had to be student initiated.

In the third presentation mode, the textbook frames were cut apart and pasted on 3" x 5" index cards, the question frame on the front of the card, the answer frame on the back (see Figure 2). This mode, Precision Teaching, stressed the teaching aspects of student-tutor interaction. In this mode, the tutor sat across a table from the student and flashed the frames sequentially. The tutor was continually available for questions, and was, in fact, encouraged to offer explanations of difficult concepts. After the subject completed the lesson, the tutor reviewed the problem frames with the student.

Testing. Retention testing was carried out at 24-hour and 7-day intervals. Tests consisted of presentation of ten randomly selected frames of the material which had been studied. Percent correct and incorrect, rate correct and incorrect (number correct and incorrect divided by testing time) were recorded.

The test-item presentation procedures were used, written testing and Precision Testing. In the written test procedure, items were retyped onto sheets of paper and answers were written on separate pages. The Precision Testing procedure utilized the same test items. However, these items were presented by the tutor in flashcard form with the student emitting a verbal response. Both testing procedures were distributed in such a way as to minimize possible order effect, utilizing an A-B-B-A presentation outline.

Reinforcement. All Ss were residents of an experimental living area in which reinforcement was supplied through a pervasive token economy. The residents were awarded "points" for various activities (such as personal skills, job assignments, and educational projects, such as the present study). These points were expendable in the token store in which food, toiletries, and other items were available, and for various privileges (use of recreation and T.V. rooms, etc.). In this project, the student and tutors each received two points per minute of study and testing time. The reinforcement was scheduled to reinforce only participation, thus leaving levels of motivation independent of token production. The amount of reinforcement did not differ significantly between teaching methods. Performance sessions, including a lesson, a 24-hour retention test, and a 7-day retention test, averaged about one hour in length. The 120 points achieved from this average lesson was worth about $.12 in the token store.

RESULTS

Teaching Methods

Of the nine Ss serving as tutors, seven completed the entire series of lessons. One S was transferred from the prison due to a disciplinary action of the prison administration, and one S declined to complete the series after about two-thirds of the lessons. For the remaining Ss, data are complete except in cases of recording errors by the tutors (which were infrequent).

Figure 3 indicates the overall outcome of the twelve experimental conditions along the variable of rate correct. Average rate correct for the three teaching methods were Classroom Programmed Textbook, 2.64; Teaching Machine, 2.83; and Precision Teaching, 3.11. These rates differed significantly on the Friedman One-way Analysis of Variance ($p < .0046$). Of interest is the fact that percent correct scores do not differ between teaching methods (Textbook, 87.56; Machine, 87.56; and Precision Teaching, 86.84). Rate, however, is the most sensitive single indicator of behavior. Johnston and Pennypacker (1971) note that "given two individuals saying the same words, we tend to be most impressed (and infer greater knowledge, learning, expertise, etc.) with the one who is fluent and does not pause, restate, stop to outline on paper what he is saying, and generally do things other than talk (p.34)." Comparisons below will heed this reasoning and refer to rates exclusively.

Within S's analyses, indicating the results in terms of each S's performance compared across teaching methods, all made use of the binomial distribution for statistical statements. Across all variables, Precision Teaching surpassed the other methods in 40 of 61 comparisons ($p < .015$). On the seven-day retention tests, Precision Teaching exceeded the others in 20 of 29 comparisons ($p < .04$); on the 24-hour retention test, Precision Teaching led 20 of 32 comparisons ($p < .07$).

Cumulative graphs of five of the seven Ss who completed the series are presented in Figure 4 and depicts the S who exhibited the greatest deviancy from the norm. This S had several very high rates correct during the Programmed Textbook mode; some as high as ten correct responses per minute. Figure 5 depicts an S in which the Teaching Machine almost equaled Precision Teaching. Figure 6 depicts the S nearest the median; the order of rates from highest to lowest is Precision Teaching, Teaching Machine, Programmed Textbook. Figure 7 depicts the S who, overall, achieved the lowest rates in the study; Precision Teaching leads in this case. Figure 8 depicts the S who, overall, achieved the highest rates in the study; and again, Precision Teaching leads.

Testing Methods

Of the two testing procedures, the interpersonal method, Precision Testing, resulted in the greatest rate correct ($p < .016$). Precision Testing averaged 3.16 and Written Testing averaged 2.56. Interestingly, the 7-day and 24-hour retention tests did not differ; 7-day retention averaged 2.85, and 24-hour retention averaged 2.86.

Inmates as Tutors

Statements about the effect of the experience on the Ss are important as statistical statements concerning the relative effectiveness of various teaching and testing methods.

First, increases in grade level were indicated, though statistical statements are not possible due to loss of Ss. Of those Ss completing the series of lessons, an average gain in the areas of instruction (English grammar) of six-tenths of one grade level occurred. One S was omitted from this statement who actually decreased one and two-tenths grade levels. Evidence was presented that his initial test score was inflated due to cheating. If, however, this score is also included, the average is three-tenths of a grade level over the 60mx hours of instruction.

Approximately 115,200 points were awarded to both students and tutors in the study. These points were negotiable for purchases in the token store and privileges, such as use of recreation and television rooms. At maximum cost, the study time involved in the study amounted to $.24 per hour.

The best statement of the efficiency of the program is that approximately 480 hours of individualized instruction were generated. The entire program was supervised by one B.A.-level staff member who contributed approximately 80 hours to the administration of the project. Therefore, for each college graduate hour, six hours of individualized instruction were generated.

DISCUSSION AND IMPLICATIONS

Certain statements about the appropriate type of education in an adult prison setting may be derived from the present study. It is apparent that some variables of effectiveness of material presentation are degree of interpersonal interaction and mode of response, written or verbal.

The present study makes use of prison inmates to provide the interpersonal interaction and to enforce the verbal responding; and their effective use is apparent in the data. Of the three teaching modes, Precision Teaching is the one most preferable for use with this population for two reasons:

1. The data indicate that fluency (if not accuracy) is enhanced by this teaching method.
2. This method of activity involves twice as many inmates in the education process.

In a population in which idleness is of great concern, such active participation is self-advancement and self-help programs, as well as cooperation with others, is a worthy result in itself.

The testing methods indicate several things also. The test-retest consistency is hypothesized to demonstrate that the inevitable retention

loss in a seven-day test-retest interval was overcome by the knowledge increase generated by studying related material during that interval.

The difference between Written and Precision Testing was partly due to the time difference between emitting a verbal and a written response. An additional variable is the addition of another person to the testing situation. It might be hypothesized that sitting before one of his peers, the student would be more concerned with efficiency in his test-taking. Anecdotal reports indicate that improvement in the area of study was a source of considerable status. In fact, as a researcher scored the post-achievement tests, all those who had taken them asked to wait in the office to receive their new scores as quickly as possible.

The ultimate test of an educational paradigm is the <u>feasibility</u> of its implementation. The procedures indicated by the present study across all teaching and testing modes are imminently feasible. It is highly economical in terms of staff requirements and grade gain per hour of participation.

Indicated by this study is the need for further research in the following directions:

1. What is the effect of mode of short-term retention testing (Written or Precision Testing) on long-term retention test scores?
2. Are the data generated in this study generalizable to other material areas?
3. What is the effect of "tutoring" on grade level? (This question was, unfortunately, contaminated in the present study by the basic education projects in which the tutors were participating.)
4. Can schedules of reinforcement be used with complex operant to augment rate and/or accuracy measures?

A final statement concerns the other of the dichotomous obligations of prisons. In addition to rehabilitation, prisons are obligated to security. During the 960 inmate hours involved in this project, the men were occupied with something other than the boredom and the general antisocial indoctrination of the convict culture. Certainly, inmates will fill their time with some activity. The rehabilitation and security responsibilities of prison administration are both augmented if that activity is productive.

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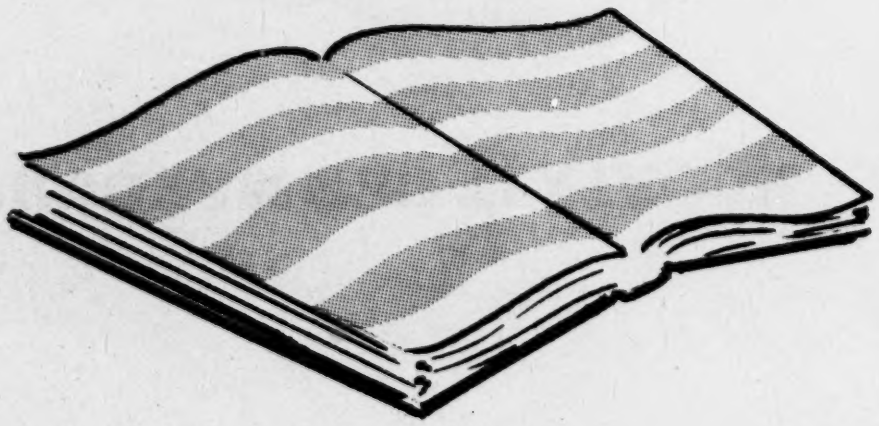
FIGURE 1

PROGRAMMED TEXTBOOK



TEACHING MACHINE

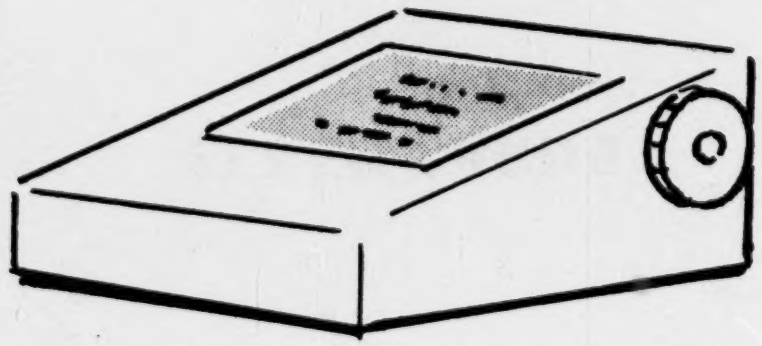
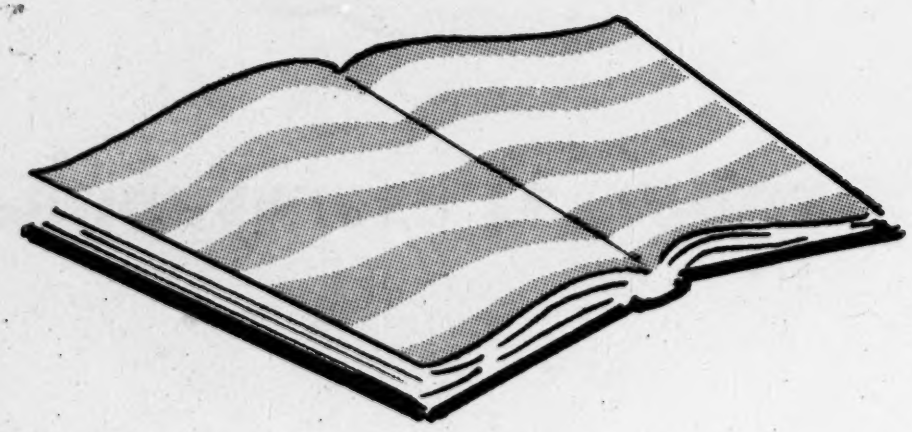


FIGURE 2

PROGRAMMED TEXTBOOK



FLASH CARDS

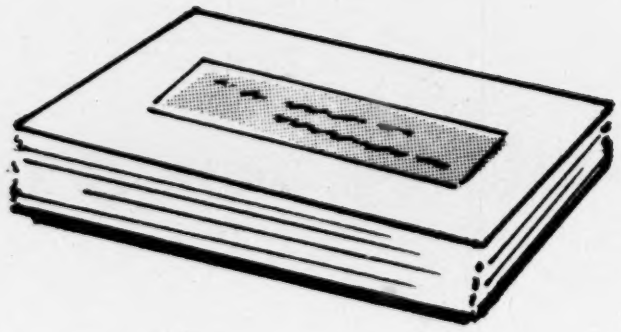


FIGURE 3

RATE CORRECT BY TEACHING AND TESTING METHODS

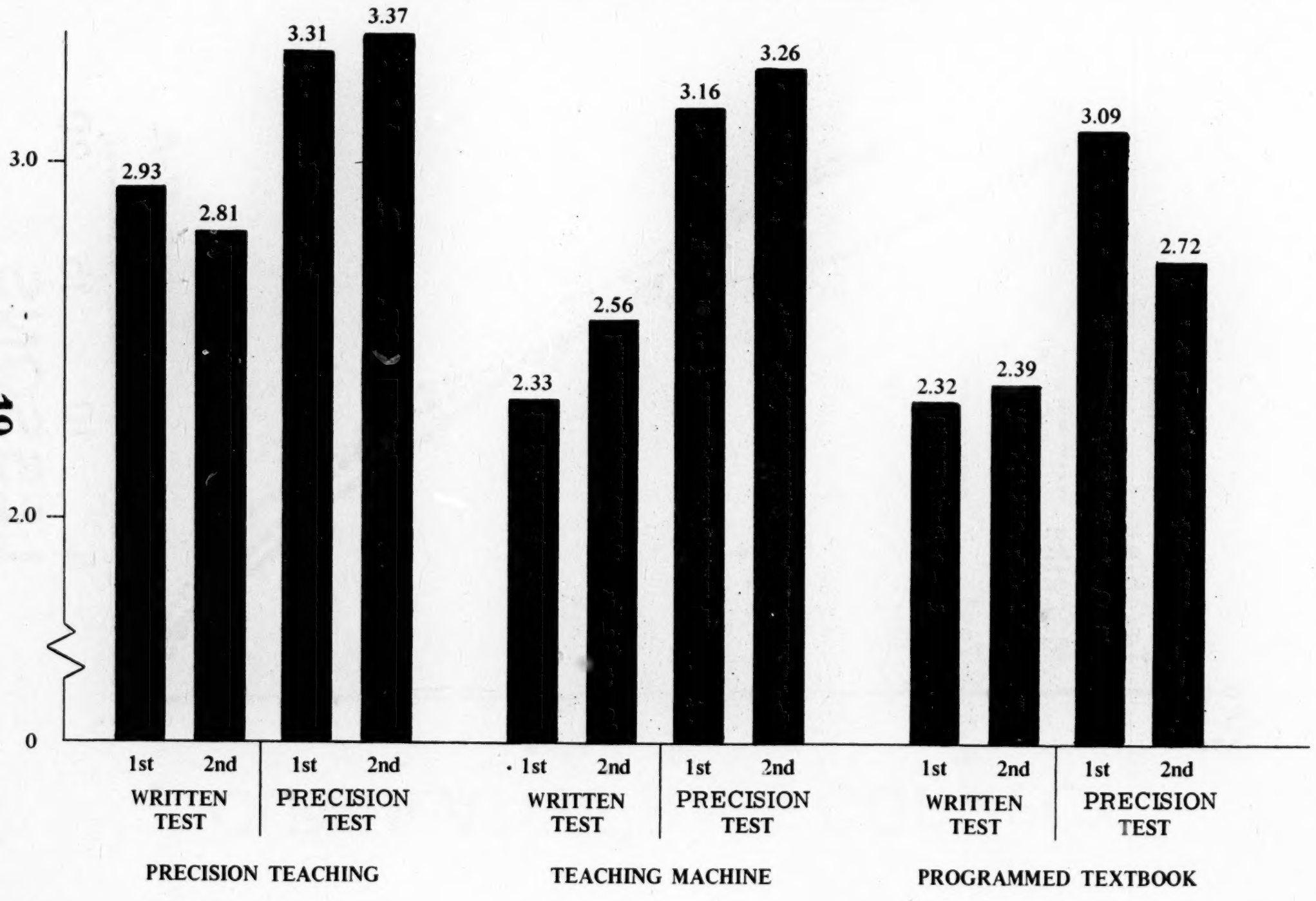


FIGURE 4

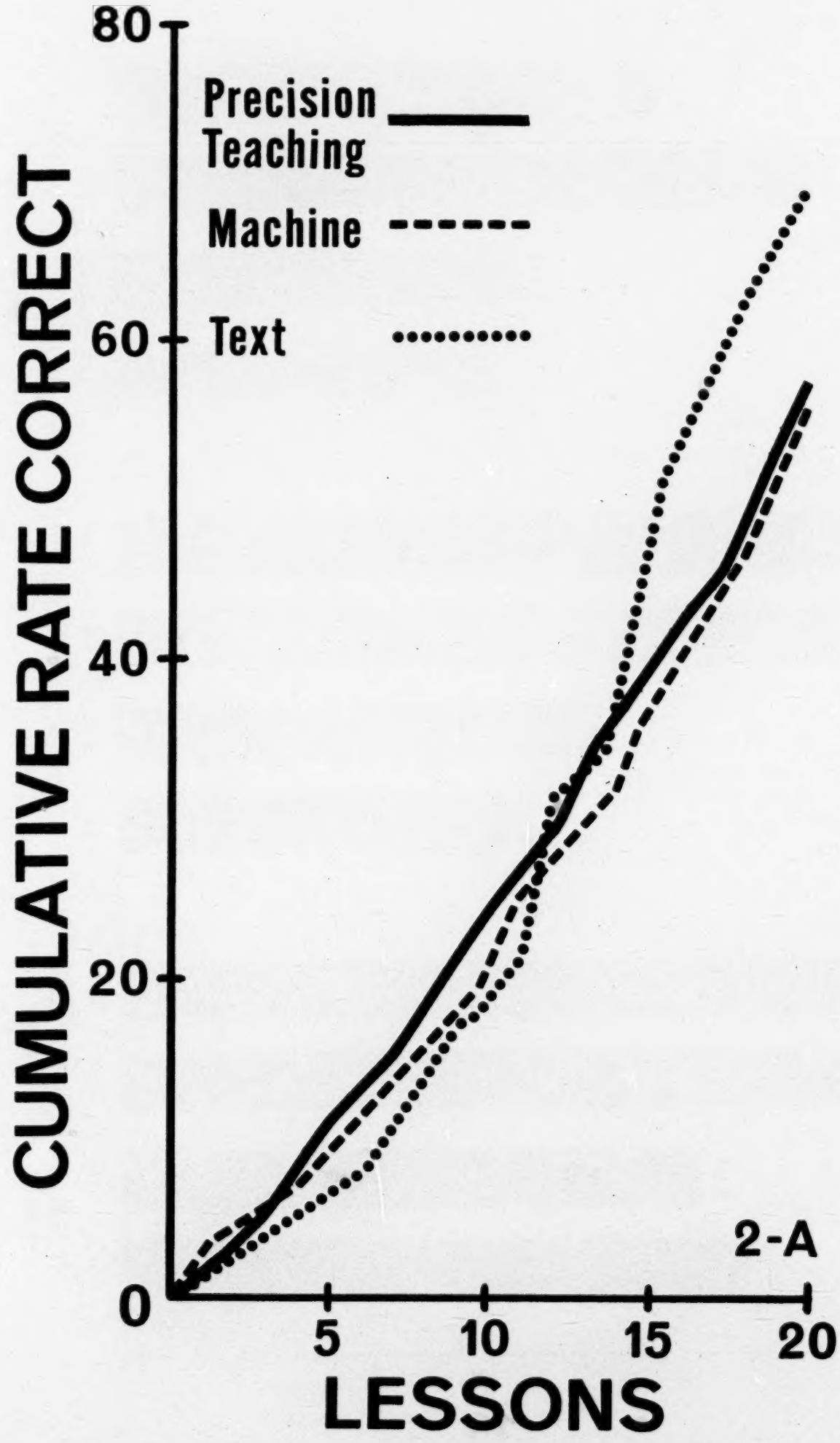

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FIGURE 5

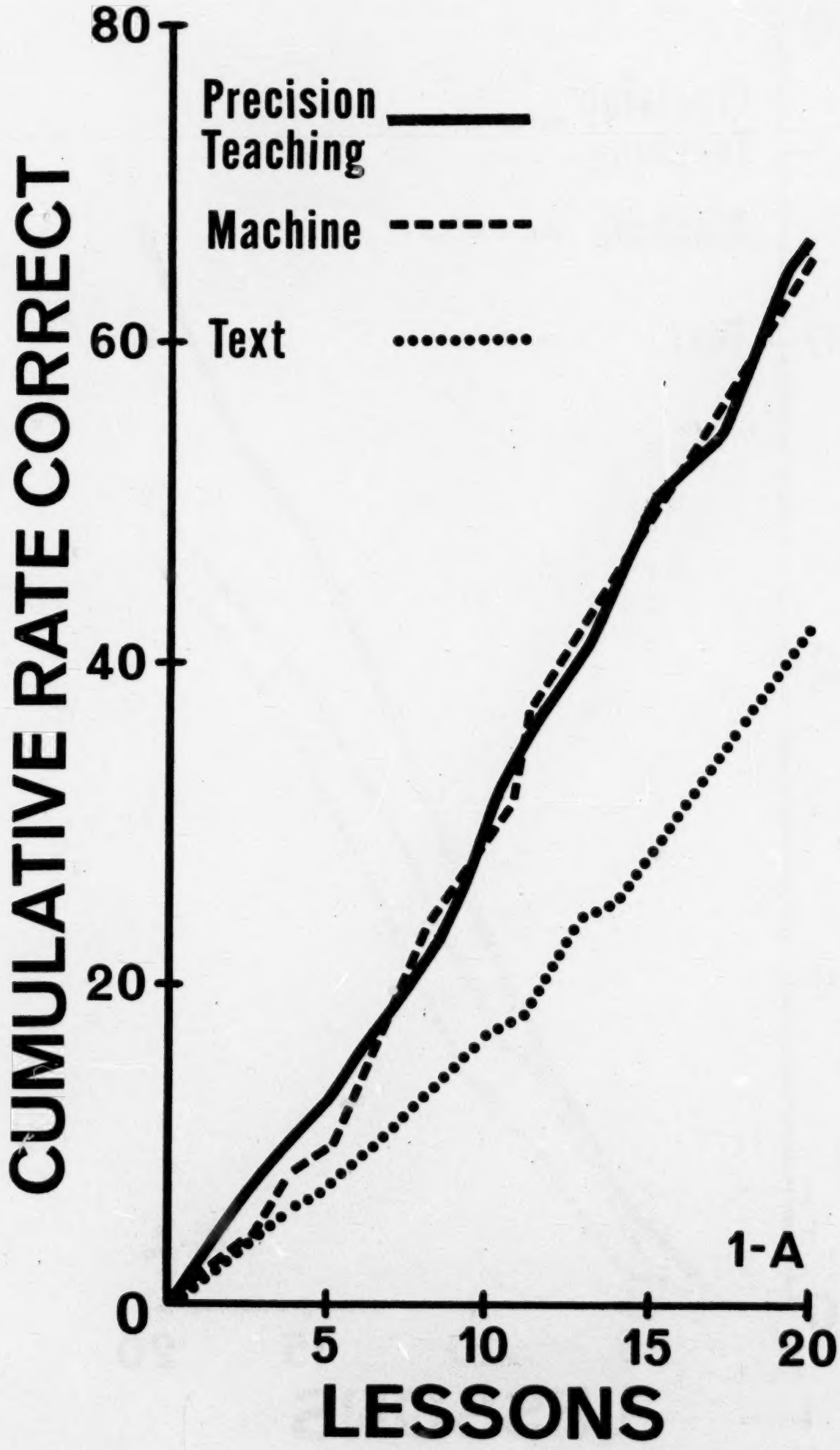
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FIGURE 6

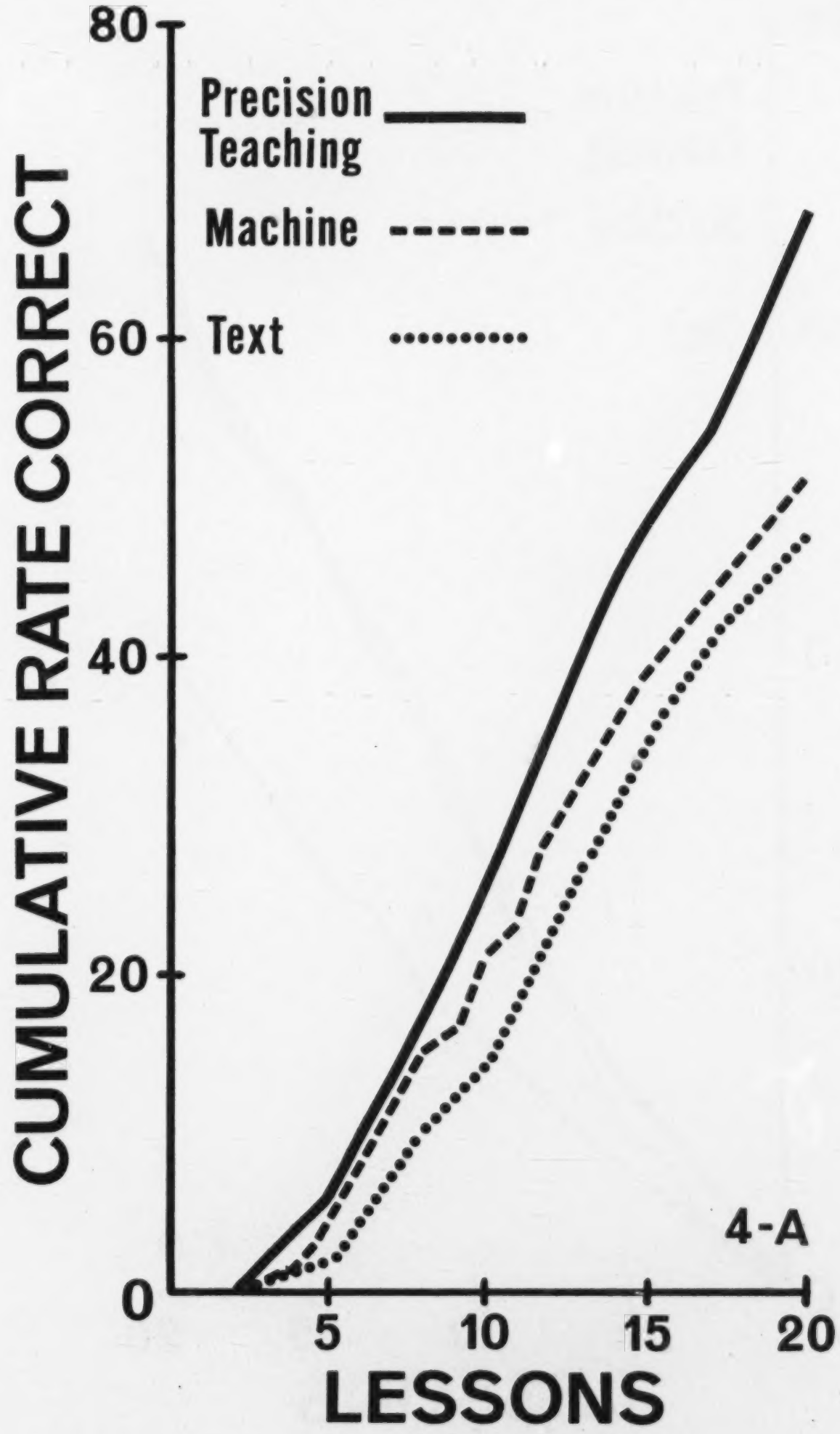
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FIGURE 7

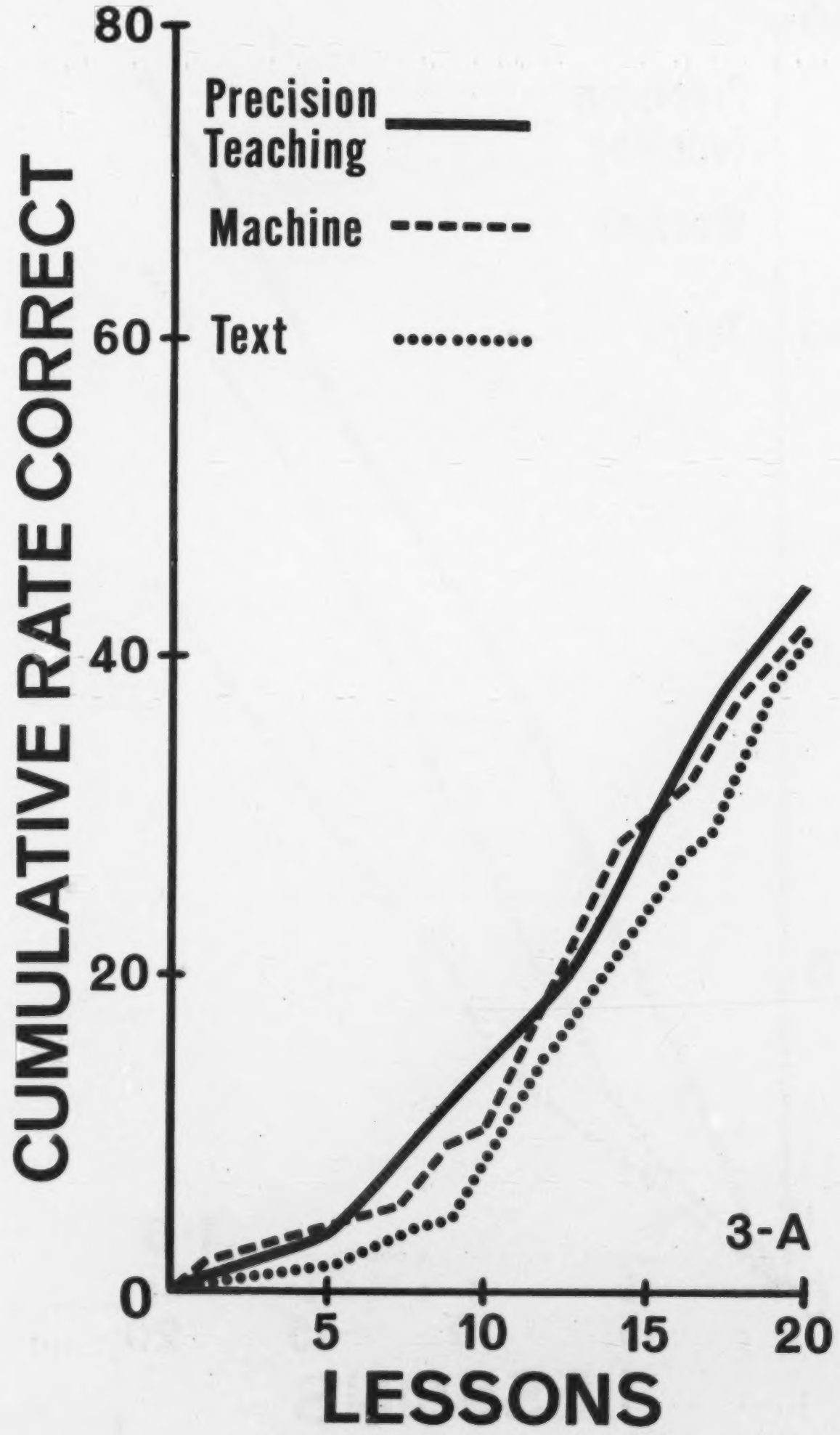
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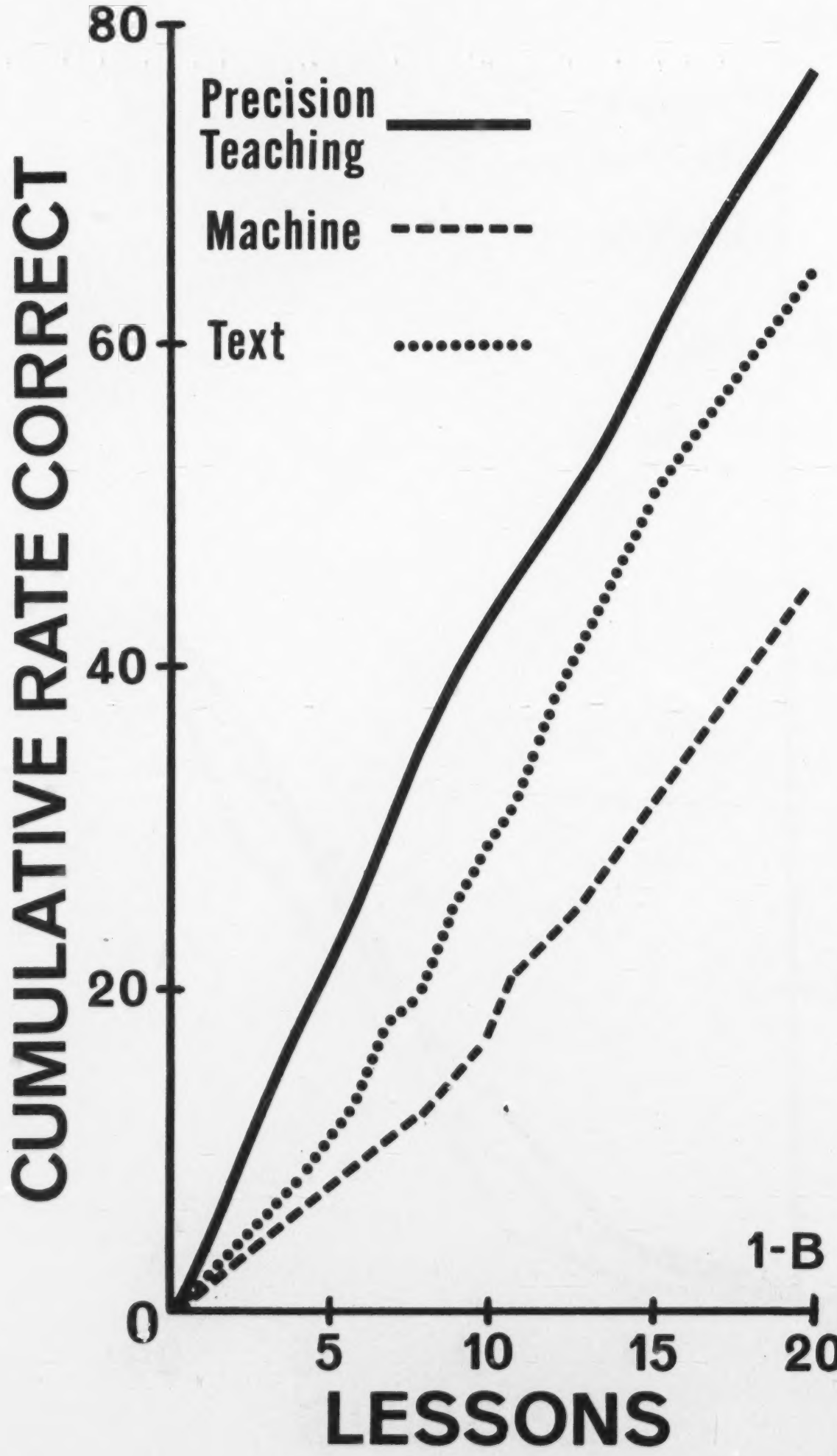
FIGURE 8



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